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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/748,058	12/30/2003	Rajesh Menon	MIT.10366	2135

7590 11/14/2005
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EXAMINER

DINH, JACK

ART UNIT	PAPER NUMBER
2873	

DATE MAILED: 11/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/748,058	Applicant(s) MENON ET AL.	
	Examiner Jack Dinh	Art Unit 2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08/25/05 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>0705</u> . | 6) <input checked="" type="checkbox"/> Other: <u>DETAILED ACTION</u> . |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 11, 12, 16-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 11, line 5, the phrase "may be" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention.

Regarding claim 12, line 5, the phrase "may be" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention.

Regarding claim 16, line 2, the phrase "may each be" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention.

Regarding claim 17, line 3, the phrase "may each be" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention.

Regarding claim 18, line 3, the phrase "may be" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1, 2, 7, 10-17 and 19-23 are rejected under 35 U.S.C. 102(a) as being unpatentable by Walt et al. (US Publication 2003/0032204).

Regarding claim 1, Walt (figure 1C) is interpreted as disclosing an optical manipulation system comprising an array of focusing elements **35**, each of which focuses an electromagnetic energy beam from an array of beamlet sources into an array of focal spots in order to manipulate a plurality of samples **40** on an adjacent substrate (paragraph 0063).

Regarding claim 2, Walt is interpreted as further disclosing that the array of beamlet sources includes an array of micromirrors **20** (paragraph 0063).

Regarding claim 7, Walt is interpreted as further disclosing that the array of beamlet sources includes a spatial light modulator (paragraph 0060).

Regarding claim 10, Walt is interpreted as further disclosing an array of microlenses interposed between the array of sources and the array of focusing elements (paragraph 0063).

Regarding claim 11, Walt (figure 1C) is interpreted as disclosing a parallel optical manipulation system comprising an array of focusing elements **35**, and an array of sources, wherein each source is positioned to selectively direct electromagnetic energy toward a focusing element, and each focusing element is positioned to direct a focused beam toward a particle **40** to be manipulated (paragraph 0063) such that a plurality of independent pairs of light traps are provided (figure 5, paragraph 0064).

Regarding claim 12, Walt (figure 1C) is interpreted as disclosing a parallel optical manipulation system comprising an array of focusing elements **35**, and an array of directionally selective elements **20**, wherein each directionally selective element is positioned to selectively direct electromagnetic energy toward a focusing element, and each focusing element is positioned to direct a focused beam toward a particle **40** to be manipulated such that each directionally selective element is employed to move a focused beam (see reference 20 and 21) to thereby manipulate a particle.

- Regarding claims 13 and 14, Walt is interpreted as further disclosing that the array of directionally selective elements includes an array of micromirrors (figure 1C, paragraph 0063) or an array of spatial light modulators (figure 5, paragraph 0064).

Regarding claim 15, Walt (figure 1A) is interpreted as further disclosing a single source 10 of electromagnetic energy that is directed toward the array of directionally selective elements 20.

Regarding claim 16, Walt (figure 1C) is interpreted as further disclosing that each of the directionally selective elements is used to selectively switch on 20 and off 21 the electromagnetic energy that is directed toward a respective focusing element.

Regarding claim 17, Walt (figure 1C) is interpreted as further disclosing that the directionally selective elements 20 are each associated with a focusing element 35, and each of the directionally selective elements is used to selectively move (see references 20 and 21) with respect to an associated focusing element, the electromagnetic energy that is directed toward the associated focusing element.

Regarding claim 19, Walt (figure 1C) is interpreted as disclosing a method of manipulating particles using electromagnetic energy, the method comprising the steps of providing an array of beamlets that are directed toward an array of focusing elements 35, focusing each of the beamlets toward a plurality of particles 40, and selectively controlling each of the beamlets to manipulate the plurality of particles (see figure, reference 21).

Regarding claim 20, Walt (figure 1C) is interpreted as further disclosing the step of providing an array of sources 20 to provide the array of beamlets.

Regarding claim 21, Walt (figure 1C) is interpreted as further disclosing the step of providing an array of directionally selective elements **20** to provide the array of beamlets.

Regarding claim 22, Walt (figure 1C) is interpreted as further disclosing that the directionally selective elements includes an array of micromirrors **20**.

Regarding claim 23, Walt (figure 1C) is interpreted as disclosing a method of manipulating particles using electromagnetic energy, the method comprising the steps of providing an array of micro-mirrors **20** that receive an electromagnetic field and provide an array of beamlets that are directed toward an array of focusing elements **35**, focusing each of the beamlets toward a plurality of particles **40**, and selectively controlling each of the micromirrors to manipulate the plurality of particles.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Walt et al. (US Publication 2003/0032204), as applied in claim 1, and further in view of Te Kolste et al. (US Patent 6,864,980).

Regarding claim 3, Walt is interpreted as disclosing all the claimed limitations, as described above, except that the array of focusing elements includes an array of diffractive elements. However, diffractive elements are well known as focusing elements. Within the same field of endeavor, Te Kolste is interpreted as disclosing this teaching (col. 4, lines 66-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the diffractive, as taught by Te Kolste, for focusing purpose.

Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walt et al. (US Publication 2003/0032204), as applied in claim 1.

Regarding claims 4-6, Walt is interpreted as further disclosing that the light source is a laser-based type (paragraph 0001). Given such teaching, light emitting diodes, semiconductor lasers, or vertical cavity surface emitting lasers would be within the knowledge of one skilled in the art as substitution. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use any type of light sources, for application-specific purposes.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Walt et al. (US Publication 2003/0032204), as applied in claim 1, and further in view of Shie et al. (US Patent 6,266,476).

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Regarding claim 8, Walt is interpreted as disclosing all the claimed limitations, as described above, except that the array of focusing elements includes an array of Fresnel lenses. However, Fresnel lenses are well known as focusing elements. Within the same field of endeavor, Shie is interpreted as disclosing this teaching (col. 5, lines 65-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the Fresnel lenses, as taught by Shie, for focusing purpose.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Walt et al. (US Publication 2003/0032204), as applied in claim 1, and further in view of Mandella et al. (US Patent 5,887,009).

Regarding claim 9, Walt is interpreted as disclosing all the claimed limitations, as described above, except that the array of focusing elements includes an array of zone plates. However, zone plates are well known as focusing elements. Within the same field of endeavor, Mandella is interpreted as disclosing this teaching (col. 10, lines 48-50). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the zone plates, as taught by Mandella, for focusing purpose.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Walt et al. (US Publication 2003/0032204), as applied in claim 23, in view of Finer et al. (US Patent 5,512,745).

Regarding claim 24, Walt is interpreted as disclosing all the claimed limitations, as described above, except that manipulating the plurality of particles involves stretching an element that includes at least two particles. However, an element can be manipulated in a

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multitude of different methods as desired which can vary depending on the shape of the element itself or the application it is used for. Within the same field of endeavor, *Finer* is interpreted as further disclosing that the manipulation of the plurality of particles involves stretching an element that includes at least two particles (see figure 1 and col. 5, lines 17-36). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to stretch an element for the purpose of manipulating the element as desired.

Allowable Subject Matter

Claim 18 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action. The following is a statement of reasons for the indication of allowable subject matter. Regarding claim 18, the prior fails to disclose that the array of micromirrors each of which is movable with respect to the associated focusing element to selectively direct a beamlet of electromagnetic energy toward a plurality of selectable locations on the focusing element.

Conclusion

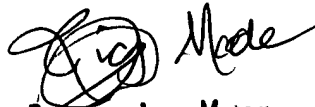
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack Dinh whose telephone number is 571-272-2327. The examiner can normally be reached on M-F (9:30 AM - 6:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky L. Mack can be reached on 571-272-2333. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jack Dinh


RICKY L. MACK
PRIMARY EXAMINER
11/9/05